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Case Report

Surgery Section

# Superficial Partial Thickness Burns Treated using Theruptor Novo, a Novel Antimicrobial Dressing: A Case Report

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## ABSTRACT

Burns are assessed by total body surface area and wound depth. Burn depth can range from Superficial Partial Thickness (SPT) to full thickness, where the epidermis, dermis, and sometimes underlying structures are involved. Scalds usually cause superficial or partial burns, which can blister and cause pain as well. A moist, pink, and shiny surface with brisk capillary refill times forms the basis for the clinical diagnosis of SPT. The goal of burn wound management is to minimise the formation of scars by adhering to fundamental principles. It is mandated that dressings be used on all occasions except for superficial burns. In the management of a patient with a history of accidental boiling water spillage over the left lower limb resulting in SPT burns, with complaints of pain and burning sensation for one month, Theruptor Novo (Healthium Medtech, India) dressing was utilised. The treatment aimed to protect the wound, maintain a moist setting, counteract burn wound infection, promote epithelisation, and minimise pain and discomfort. Theruptor Novo prevented infection, promoted wound healing, with good moisture effectively, and provided patient comfort.


**Keywords:** Grafting, Infection, Keratinocyte, Re-epithelialisation, Silver sulfadiazine

## CASE REPORT

A 65-year-old male patient with diabetes mellitus for 15 years and undergoing treatment presented with a history of accidental boiling water spillage over the left lower limb, resulting in burns. He complained of pain and a burning sensation for one month. His HbA1c level was 9.1, and on clinical examination, it was found that the patient had sustained around 1% burns injury to the left foot dorsum, of size 10×9 cm [Table/Fig-1]. The injury was a non healing SPT burn. The goal was to protect the wound, maintain a moist setting, counteract burn wound infection, promote epithelisation, and minimise pain and discomfort. The treatment plan involved wound debridement and regular dressing using Theruptor Novo dressing (Healthium Medtech, India). Standard burns injury management protocols were followed, with wound debridement performed as needed, and normal saline used for wound wash and Theruptor Novo dressing was used as the primary dressing, with a secondary dressing used to secure the primary dressing. The patient was followed-up after three days, on the 4th day of treatment [Table/Fig-2], no signs of infection were observed. Subsequently, wound dressing was done once every five days using Theruptor Novo [Table/Fig-3], and the wound completely healed within three weeks [Table/Fig-4]. There were no signs of infection, and the dressing did not adhere to the wound during removal, maintained the wound moisture during all follow-up visits. As planned, Theruptor Novo effectively prevented infection, promoted wound healing, managed moisture well, and provided patient comfort.

**[Table/Fig-1]:** Non healing burn injury wound presentation on Day 1 of treatment (one month after burn injury).
**[Table/Fig-2]:** After Theruptor Novo dressing removal, wound presentation without any signs of infection on the 4th day of treatment. (Images from left to right)

**[Table/Fig-3]:** Wound presentation with healing epithelisation on the 9th day of treatment.
**[Table/Fig-4]:** Wound presentation with epithelisation and well-managed exudate on the 21st day of treatment. (Images from left to right)

## DISCUSSION

"Burn" is an important public health concern worldwide. More people die from burns than from malaria and tuberculosis [1]. In India, around seven million people suffer from burns each year, resulting in 1.4 lakh deaths and 2.4 lakh individuals experiencing disabilities [2]. Burns are assessed by total body surface area and wound depth. Burn depth can range from SPT to deep partial thickness and full thickness, involving the epidermis, dermis, and sometimes underlying structures. Scalds usually cause superficial or partial burns, leading to blistering and pain [3].

The goal of burn wound management is to minimise scar formation and prevent infections by adhering to fundamental principles. It is mandated that dressings be used in all cases except for very superficial burns [4,5]. An ideal burn wound dressing should possess certain qualities. It should effectively maintain the temperature and moisture of the wound, creating a conducive environment for healing. Additionally, the dressing should allow for wound respiration, facilitate epithelial migration, act as a barrier to prevent environmental bacteria entry, minimise pain, and accelerate the wound healing process [6].

Burn surfaces are prone to rapid bacterial colonisation, increasing the risk of invasive infections. Proper infection management practices, including the use of topical antimicrobials and debridement or surgery when necessary, are essential to reduce the chances of wound infection [7]. To minimise the cross-contamination from pathogens like Methicillin-Resistant *Staphylococcus aureus* (MRSA), closed dressings are often recommended to prevent burn wound infection, delayed healing, and skin graft loss [8]. In cases of systemic infection, systemic antimicrobial therapy in addition to local wound care is necessary. Innovations in burn care have significantly improved the survival rate of burn patients, with mortality decreasing from nearly 100% for 30% burns in the early 1900s to over 50% in young, healthy patients with burns up to 95% [9].

Regarding the evolution of burn dressings, current dressings for burns, especially SPT burns, include antimicrobial dressings such as topical 1% silver sulfadiazine cream, which may cause delayed healing due to keratinocyte toxicity, and non microbial dressings like skin substitutes, which are expensive [10]. In previous studies, Theruptor Novo has demonstrated its effectiveness against pathogens, ease of use, and lack of cytotoxic or allergenic substrates. These benefits could make Theruptor Novo an affordable alternative for treating SPT burns [8,11-13]. Theruptor Novo is a non adherent wound dressing that utilises Dimethyl Tetradecyl (3-(trimethoxysilyl) propyl) Ammonium Chloride (DTAC) for its antimicrobial action. The dressing's antimicrobial mechanism involves physically killing bacteria, offering several benefits. One advantage is that it can reduce the reliance on chemically active antimicrobials such as silver sulfadiazine cream and silver-based dressings, which translates to minimising the risk of microbial resistance and cytotoxic effects [8]. Theruptor Novo has proven to be effective against a wide range of wound pathogens, including MRSA, Vancomycin-Resistant *Enterococcus* (VRE), *Pseudomonas aeruginosa, Candida albicans, and Aspergillus* niger. Importantly, it achieves these results without promoting the development of drug-resistant strains [7].

The frequency of dressing changes should be frequent enough to control discharge but not so frequent as to prevent wound re-epithelialisation. The frequency of dressing varies from every two days to once a week, depending on the amount of discharge and the type of dressing being used. Dressings may need to be changed more frequently in cases of significant discharge, weeping, or infection [7,11]. Theruptor Novo aids in the process of gaseous exchange, preserving a moist environment, and effectively manages exudates. The frequency of dressing changes when using Theruptor Novo depends on the quantity of exudate present and may occur every one to three days, making it suitable for use in both acute and chronic wounds.

## CONCLUSION(S)

With advancements in medical technology, there are now numerous wound dressings available. However, an ideal wound dressing should aim to prevent infection, promote wound healing with good moisture management, and provide patient comfort. This case is a springboard for further research to explore the Theruptor Novo wound dressing's ability to combat antimicrobial resistance and address the current challenges in providing cost-effective burn care, especially for patients with SPT burns.

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